

comprises a plurality of light emitting diodes arranged around an axis of the object, and the method further comprises:

controlling a subset of the plurality of the light emitting diodes that are facing the plurality of position sensitive detectors to turn on, wherein the subset of the plurality of the light emitting diodes that are facing the plurality of position sensitive detectors is determined based on the orientation measurements of the object acquired from the inertial measurement unit.

**19.** The method of claim **15**, wherein acquiring, from each of a plurality of position sensitive detectors, a respective 2D location measurement of at least one light source of the tracked sensor unit attached to each object in response to light from the at least one light source being focused onto the plurality of position sensitive detectors by respective optical lenses comprises:

tracking an intensity of light on the plurality of position sensitive detectors; and

acquiring, from the plurality of position sensitive detectors, the respective 2D location measurements in response to the intensity of the light on the plurality of position sensitive detectors being greater a threshold.

**20.** The method of claim **19**, further comprising:

transmitting an acknowledgment to the tracked sensor unit attached to each object in response to acquiring, from the plurality of position sensitive detectors, the

respective 2D location measurements of at least one light source of the tracked sensor unit attached to each object.

**21.** An apparatus for tracking position and orientation of an ultrasound probe in 3D space, comprising:

a tracked sensor unit attached to the ultrasound probe, the tracked sensor unit comprising a plurality of light emitting diodes arranged in a pattern around an axis of the ultrasound probe and an inertial measurement unit; and

a position sensitive detector tracking device comprising:

a plurality of position sensitive detector sensors combined with optical lenses that focus light emitted from one or more of the plurality of light emitting diodes of the tracked sensor unit onto each position sensitive detector sensor, and

a processing unit configured to calculate the position and orientation of the ultrasound probe in three-dimensional space from output of the inertial measurement unit of the tracked sensor unit attached to the ultrasound probe and output of the plurality of position sensitive detector sensors in response to light emitted from at least one of the plurality of light emitting diodes of the tracked sensor unit being focused on the each position sensitive detector sensor by the optical lenses.

\* \* \* \* \*